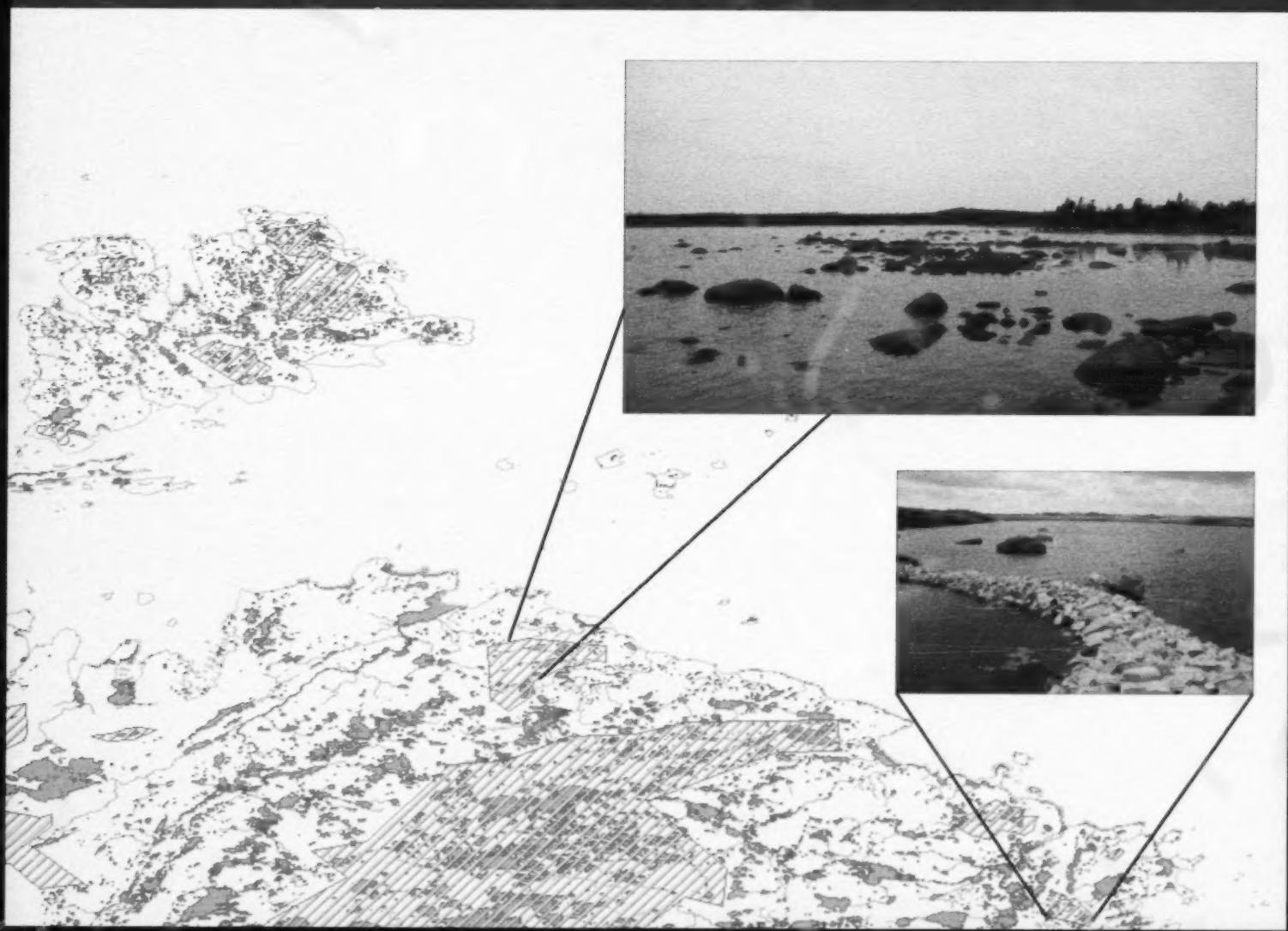
Drinking Water Safety in Newfoundland and Labrador

Annual Report 2015

Newfoundland Labrador

Environment and Conservation



Drinking Water Safety
in Newfoundland and Labrador

Annual Report
2015

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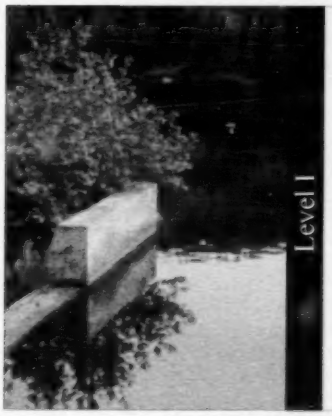
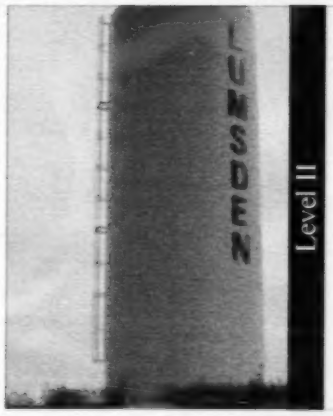
Executive Summary

This is the fourteenth annual report prepared by the Department of Environment and Conservation, Government of Newfoundland and Labrador. This report describes the initiatives, activities and accomplishments pertaining to the Multi-Barrier Strategic Action Plan (MBSAP) for drinking water safety of public drinking water systems for the 2014–15 fiscal year.

Highlights of MBSAP component indicators for the 2014–15 fiscal year include:



- 313 protected public water supply areas in the province
- 196 land use referrals reviewed for proposed activities concerning protected public water supply areas
- 128 development activity permits
- 5 watershed management committees
- 488 disinfection systems, 132 drinking water treatment systems, 18 water treatment plants (WTPs) and 25 potable water dispensing units (PWDUs)
- $49,400,000 approved by the Department of Municipal Affairs for water infrastructure projects
- 155 permits to construct water and sewer infrastructure
- 321 active permits to operate drinking water systems



- 213 active boil water advisories as of March 31, 2015
- 18,648 bacteriological samples and 3,016 chemical and physical water quality samples were collected
- Bacteriological and chemical drinking water quality exceedances recorded (Table 11)
- 1,152 community drinking water quality reports published
- 35 regulatory inspections performed
- 12 education and 110 on-site training seminars conducted
- 414 certified water or wastewater system operators
- 269 participants at the 2015 Annual Drinking Water Safety Workshop
- Corrective measures undertaken (Table 16)

- Drinking Water Treatment Standards drafted
- Study on the Evaluation of Filtration Systems in Newfoundland and Labrador
- Study on the Effectiveness of Water Treatment Plants in Newfoundland and Labrador

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Message from the Minister

As Minister of Environment and Conservation, I am pleased to present the 2015 Annual Report on Drinking Water Safety in Newfoundland and Labrador.

This report highlights the accomplishments and activities undertaken through the Multi-Barrier Strategic Action Plan (MBSAP) in the past year.

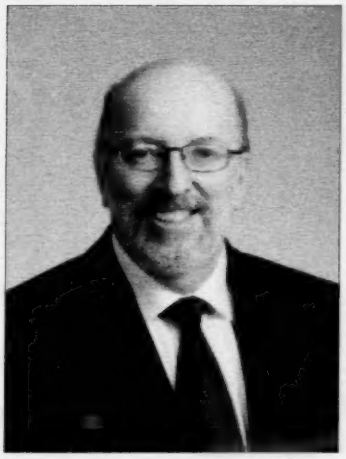
The MBSAP was established in 2001 and provides the framework for the Province's Drinking Water Program. The Plan is a comprehensive and adaptive framework for managing and ensuring the safety of public drinking water systems in the province.

Implementation of the MBSAP is a joint effort involving dedicated community governments and the provincial agencies involved in the management of drinking water: the Departments of Environment and Conservation, Health and Community Services, Municipal Affairs, Service NL, and the province's Regional Health Authorities.

Since its adoption, improvements to source water protection, water treatment, operation and maintenance of water distribution systems, water quality monitoring and reporting, and operator training have all helped increase the safety of public drinking water systems.

Part of the work of implementing the MBSAP is to identify the challenges of providing safe drinking water and develop new programs, tools and approaches to help address them. This work is highlighted in this report.

I commend the hard work of all involved in providing clean, safe and reliable drinking water to the people of Newfoundland and Labrador.



Honourable Perry Trimper
Minister of Environment and Conservation

Introduction

This is the fourteenth annual report on the management of public drinking water systems prepared by the Department of Environment and Conservation (ENVC). This report highlights the initiatives, activities and accomplishments of the departments that implemented the Multi-Barrier Strategic Action Plan (MBSAP) in the 2014–15 fiscal year (April 1, 2014 to March 31, 2015). The report describes the three levels of the MBSAP and their various components (Figure 1). It illustrates how Government is implementing the MBSAP, describes the intended path forward, and plans for future implementation of the MBSAP.

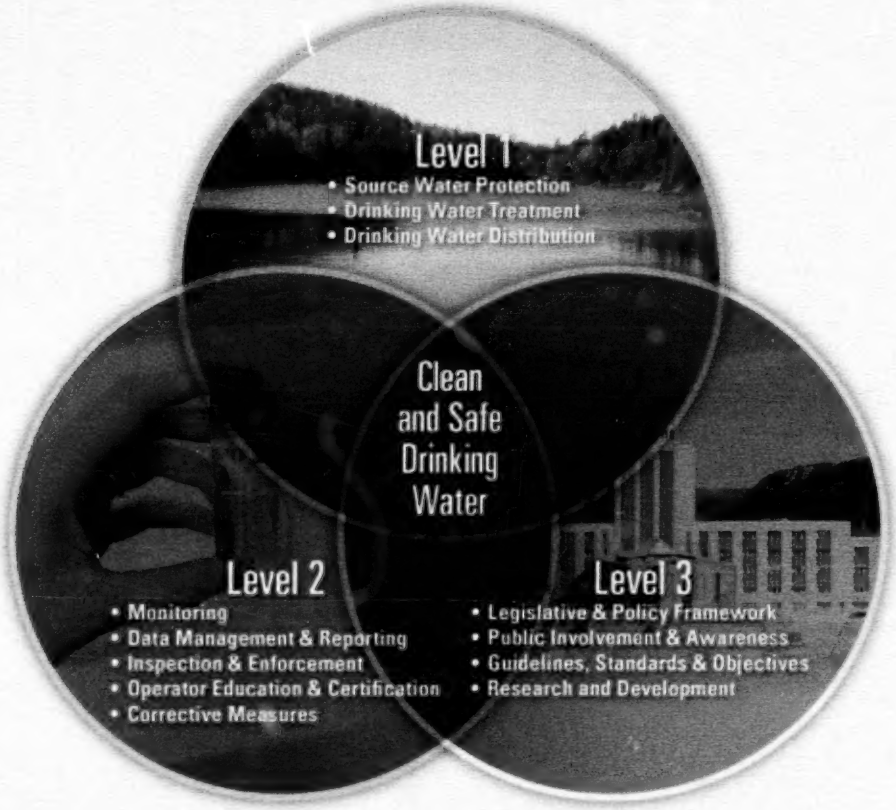
The MBSAP is considered to be the most effective method of managing drinking water systems and has been implemented by other jurisdictions throughout Canada.

The implementation of the MBSAP involves the collaborative efforts of four provincial government departments:

1. Environment and Conservation (acting as the lead agency)
2. Health and Community Services
3. Municipal Affairs
4. Service NL

In this report, indicators are reported for various components of the MBSAP. Information is reported for the current fiscal year alongside of previous fiscal years, to evaluate performance of the existing drinking water framework. In addition, illustrations of technical work related to drinking water in this province are highlighted.

Figure 1: The Multi-Barrier Strategic Action Plan



Level I

The components of the first level of the MBSAP protect drinking water from the source to the tap.

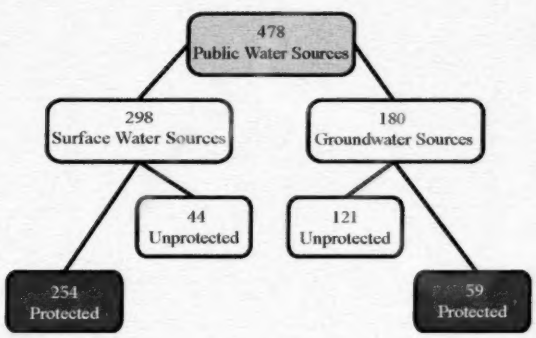
The three components of Level I of the MBSAP are:

1. source water protection
2. drinking water treatment
3. drinking water distribution

Source Water Protection

Protected public water supply areas (PPWSAs) are protected under section 39 of the *Water Resources Act*. These PPWSAs service a population of 373,854, representing 92% of the population serviced by public drinking water systems. Figure 2 shows the status of public water sources for fiscal year 2014–15.

Figure 2: Status of Public Water Sources



The Department of Environment and Conservation encourages all communities to begin the protection process for new or existing drinking water sources if they have not already done so.

Watershed Management

The Water Resources Management Division (WRMD) of the Department of Environment and Conservation regulates development activities within protected public water supply areas. WRMD uses a number of tools to monitor such activities, including:

- referrals from the Interdepartmental Land Use Committee (ILUC), Crown Lands Administrative Division, Natural Resources, Municipal Affairs and other agencies (Environmental Assessment (EA))
- permits for development activity
- watershed management plans
- watershed management committees

Referrals

In the 2014–15 fiscal year, the WRMD processed 196 referrals from various departments for proposed activities concerning PPWSAs as outlined in Table 1.

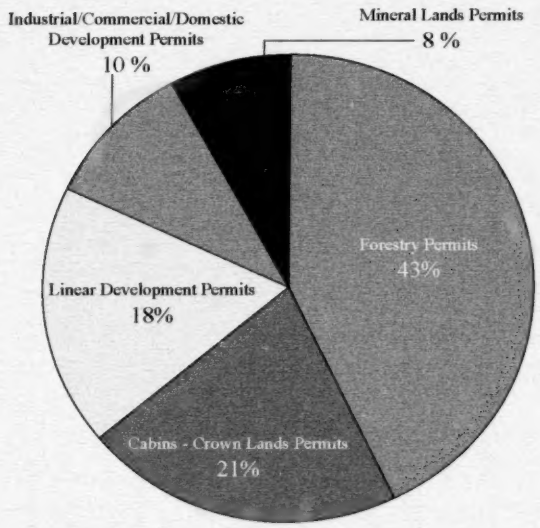
Table 1: Number of Referrals Processed

Type of Referral	Count
Crown Lands Administrative Division	91
Natural Resources	59
Interdepartmental Land Use Committee	34
Municipal Affairs	7
Other (EA, etc.)	5
Total	196

Activity Permits

All activities in a PPWSA (either a protected public water supply area, or a wellhead protected water supply area) require a permit. Under the *Water Resources Act*. During the 2014–15 fiscal year, 128 development activity permits were issued. Figure 3 illustrates the distribution of development permits by type. Figure 4 shows the total number of permits issued for development activities within a PPWSA for each fiscal year since 2010–11.

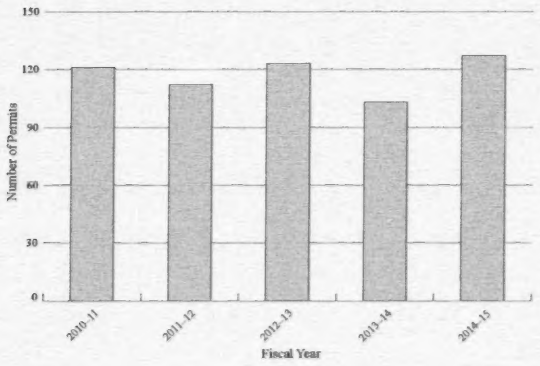
Figure 3: Type of Development Permits



The top three developmental activities for which permits were issued include:

1. linear developments
2. forestry activities
3. cabins - crown lands applications

Figure 4: Permits Issued per Fiscal Year



Watershed Management Committees

Watershed management committees are formed to oversee land use management, potential development, and resource use conflict inside a PPWSA. Some committees develop watershed management plans (WMP) to help manage the watershed. The active watershed management committees in the province during 2014–15 are located in:

- Clarenville
- Corner Brook (WMP)
- Gander (WMP)
- Grand Falls–Windsor
- Steady Brook (WMP)

Drinking Water Treatment

Several water treatment strategies are used to address different water quality issues to treat the water before it is consumed.

Disinfection

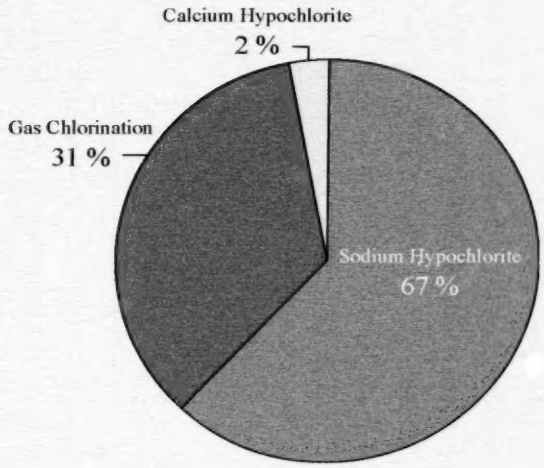
The most critical aspect of water treatment is disinfection. While there are several forms of disinfection used in the treatment of drinking water, chlorination is the most commonly used disinfection method in the province. The different disinfection methods used in the province are listed in Table 2.

Table 2: Number of Disinfection Systems in Newfoundland and Labrador

Disinfection Systems	Count
Chlorination	441
Ultraviolet Light (UV)	34
Mixed Oxidants	8
Ozone	4
Chloramines	1

Figure 5 illustrates the distribution of different chlorination types in the province during 2014–15.

Figure 5: Chlorination Systems Used in Newfoundland and Labrador



Parameter Specific Drinking Water Treatment

Mitigative measures have been implemented in numerous drinking water systems to alleviate parameter specific water quality challenges. Table 3 shows the number and type of drinking water treatment systems operational in the province as of the 2014–15 fiscal year.

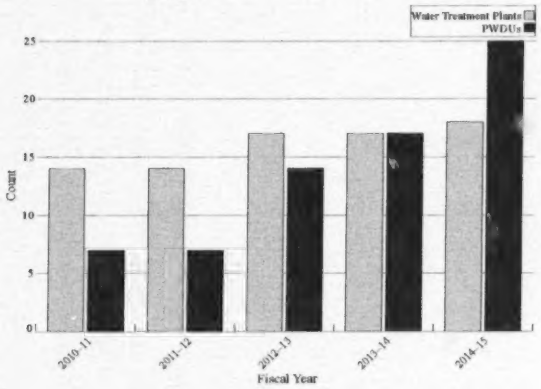
Table 3: Number of Water Treatment Systems in Newfoundland and Labrador

Drinking Water Treatment Systems	Count
pH adjustment	55
Micron/pressure filters	34
Infiltration galleries	25
Arsenic removal	10
Iron/manganese removal	6
Lead removal	1
Strontium removal	1

Water Treatment Plants

As of March 31, 2015, 43 water treatment plants are in place in Newfoundland and Labrador (this number includes 25 potable water dispensing units (PWDUs)). Figure 6 illustrates the total number of water treatment plants in Newfoundland and Labrador for each fiscal year since 2010–11.

Figure 6: Water Treatment Plants per Fiscal Year



Drinking Water Distribution

The drinking water distribution system is the largest component of physical infrastructure that ensures drinking water safety. It includes all the pipes, valves, service lines, pumping stations, fire hydrants, and storage facilities required to deliver clean and safe drinking water.

In the 2014–15 fiscal year there were 529 public water distribution systems in Newfoundland and Labrador. Table 4 shows the breakdown of the number of water distribution systems in the province for 2014–15. Sixty-eight percent of public water distribution systems in Newfoundland and Labrador fall into the "very small" classification, as they serve populations of 500 or fewer people.

Table 4: Public Water Distribution System Classes for 2014–15

Water Distribution System	Population	Count
Very Large	> 50,000	1
Large	15,001- 50,000	2
Medium	1,501 - 15,000	41
Small	501 - 1,500	82
Very Small	≤ 500	358
Unknown	variable	45
Total		529

During the 2014–15 fiscal year, the Department of Municipal Affairs approved $49,400,000 for water related projects. Table 5 provides a breakdown of initiatives for the April 1, 2014 to March 31, 2015 fiscal year. The Provincial Government share less GST amounts are shown.

During the 2014–15 fiscal year, the Department of Environment and Conservation issued 155 permits to construct water and sewer infrastructure under Sections 36 & 37 of the *Water Resources Act*. Figure 7 shows the number of permits to construct issued for each fiscal year since 2010–11.

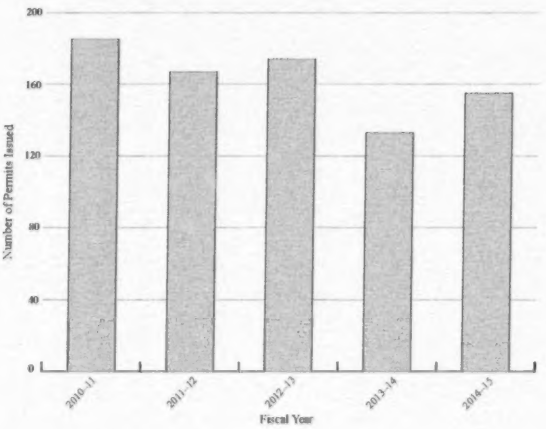
Table 5: Funding Approved by Department of Municipal Affairs for 2014–15

Category	*Funding ($)
New Water Distribution	9,900,000
Upgrades to Water Distribution	33,300,000
New Drinking Water Treatment	500,000
**DWSI/PWDU	2,300,000
Upgrades to Drinking Water Treatment	2,300,000
Studies	1,100,000
Total	49,400,000

**Provincial share less GST amounts shown*
***Drinking Water Safety Initiative/Potable Water Dispensing Units.*

In the 2014–15 fiscal year, the Department issued one permit to operate. The total number of active permits to operate for drinking water systems at the end of the 2014–15 fiscal year was 321.

Figure 7: Number of Permits to Construct per Fiscal Year



Level II

The standard of performance achieved in Level I of the MBSAP is verified through the components of Level II.

The five components in Level II of the MBSAP are:

1. monitoring
2. data management and reporting
3. inspection and enforcement
4. operator education, training, and certification
5. corrective measures

Monitoring

Drinking water quality monitoring consists of regular sampling and testing of drinking water from both the source and the tap. The extensive monitoring program for drinking water quality in the province is a joint responsibility shared by the Departments of Environment and Conservation, Health and Community Services, and Service NL.

Bacteriological and Chemical Water Quality

Bacteriological Water Quality

Under the direction of Service NL, Environmental Health Officers and Environmental Technicians collect tap water samples from public drinking water supplies for analysis of bacteriological parameters. The parameters monitored include total coliforms and *Escherichia coli* (*E. coli*). During the 2014–15 fiscal year, 18,648 public water supply bacteriological samples were collected and tested. Figure 8 shows the total number of bacteriological samples that were collected and tested for each fiscal year since 2010–11.

The number of bacteriological samples tested at each regional drinking water testing facility is shown in Table 6.

Figure 8: Bacteriological Samples Tested per Fiscal Year

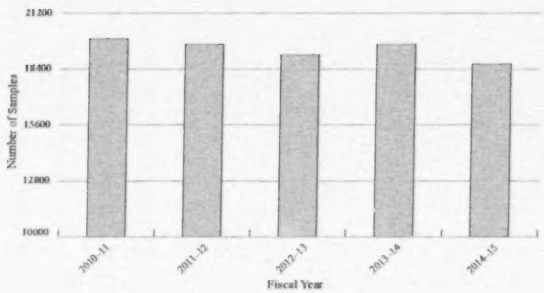


Table 6: Number of Bacteriological Samples Tested in Each Region for 2014–15

Region sampled	Count
St. John's Region	7,740
Western Region	4,417
Central Region	3,852
Northern Region	1,529
Eastern Region	1,110
Total	18,648

Bacteriological Parameters: Results

Based on the analysis of bacteriological parameters for public drinking water samples taken during the 2014–15 fiscal year, 932 public water supply samples tested were found to be unsatisfactory in terms of total coliforms. Table 7 shows the number of samples found to be unsatisfactory for total coliforms, at each regional drinking water testing facility, for the fiscal year 2014–15.

Table 7: Number of Unsatisfactory Samples for Total Coliforms for 2014–15

Region Tested for Total Coliforms	Samples
St. John's Region	264
Western Region	352
Central Region	219
Northern Region	55
Eastern Region	42
Total	932

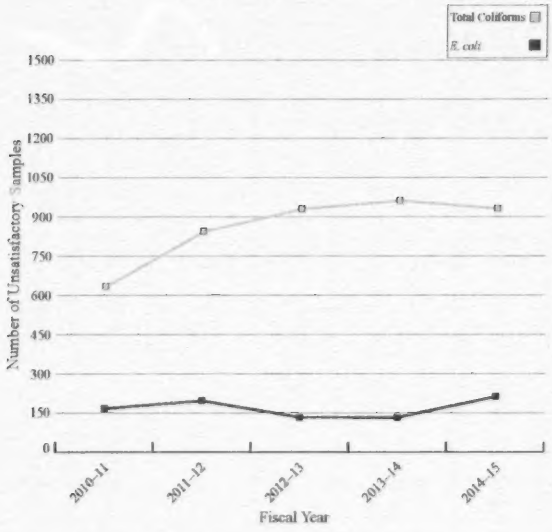
There were 211 bacteriological samples tested that were found to be unsatisfactory in terms of *E. coli**. Table 8 shows the number of samples found to be unsatisfactory for *E. coli.*, at each regional drinking water testing facility, for the fiscal year 2014–15.

Table 8: Number of Unsatisfactory Samples for *E. coli* for 2014–15

Region Tested for *E. coli*	Unsatisfactory Samples
St. John's Region	51
Western Region	84
Central Region	55
Northern Region	14
Eastern Region	7
Total	211

The number of unsatisfactory samples for total coliforms and *E. coli* for each fiscal year since 2010–11 is shown in Figure 9.

Figure 9: Unsatisfactory Bacteriological Samples per Fiscal Year



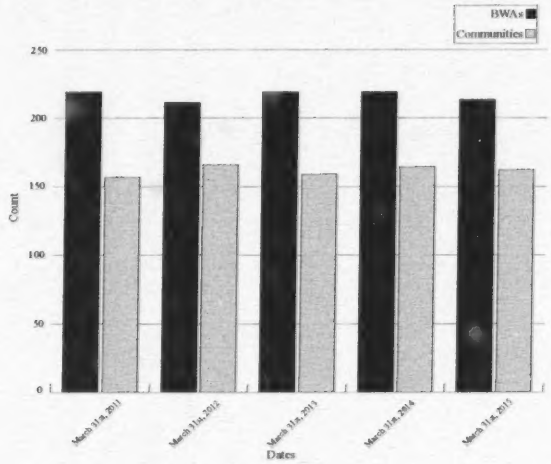
**Escherichia coli (E. coli) is considered a good indicator of recent fecal contamination of drinking water and the possible presence of disease causing microorganisms.*

Boil Water Advisories

Boil water advisories (BWAs) are preventative measures for protecting public health from waterborne microbiological contamination that may, or are known to be, present in drinking water. A BWA is also issued when water quality is questionable due to operational deficiencies (such as inadequate chlorine residual), no disinfection system, or the water in a community's water system is contaminated with bacteriological indicators (such as total coliforms).

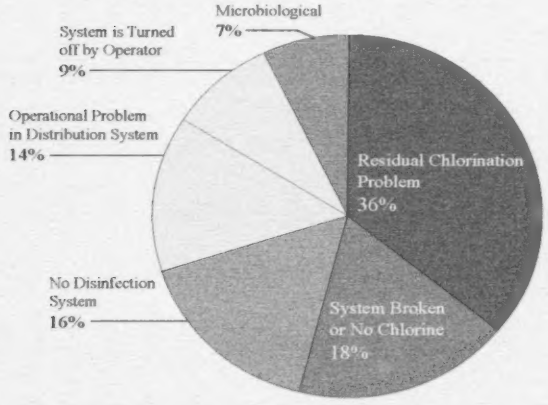
When discussing BWAs for the purpose of this annual report, it is referring to BWAs in effect at the end of the fiscal year, March 31, 2015. Figure 10 shows a historical comparison of BWAs at the end of each fiscal year since March 31, 2011.

Figure 10: Number of BWAs and Number of Communities Affected



On March 31, 2015, 213 BWAs were in effect (this includes long-term BWAs), affecting 156 communities in the province, with an impacted population of 45,124. Figure 11 illustrates the distribution of existing BWAs by reason used to issue the advisory for the 2014–15 fiscal year.

Figure 11: Reasons for BWAs



Long term BWAs are BWAs that have been in effect for a period of five years or greater at the end of the 2015 calendar year. A total of 138 BWAs have been in effect for a period of five years or greater.

Chemical and Physical Water Quality

The number of chemical and physical water quality samples taken per region for 2014–15 are presented in Table 9. Analysis of chemical and physical parameters is performed by an accredited lab ensuring that the laboratory provides quality and competency in its sample analysis.

Table 9: Number of Samples Taken by ENVC for 2014–15

Region	Source	Tap	THM	HAA	Total
Eastern	11	344	350	350	1055
Western	28	225	243	243	739
Central	28	215	347	347	937
Labrador	17	62	98	98	275
Other (special)	2	4	2	2	10
Totals	86	850	1,040	1,040	3,016

In 2014–15, the Department of Environment and Conservation collected 3,016 samples. Additional samples may also be taken for communities due to community concerns, special monitoring programs or water quality studies for chemical parameters from public water supplies. Seventy-nine percent of the samples that were scheduled for this fiscal year were collected. Table 10 shows the number of samples scheduled and the number actually taken for 2014–15.

Table 10: Number of Samples Scheduled and Collected by ENVC for 2014–15

Type of Sample	Scheduled	Collected	Percent
Tap Water Sample	1,085	850	78
THM Water Sample	1,309	1,040	79
HAA Water Sample	1,309	1,040	79
Source Water Sample	92	86	93
Total	3,795	3,016	79

The reasons that some samples were not taken are as follows:

- Eastern region Environmental Scientist position vacant (August - November 2014)
- Western region Environmental Scientist position vacant (November 2014 - May 2015)
- safety (source samples)
- town was not chlorinating at the time of sampling (THM and HAA samples)
- water supply not operating at the time of sampling (tap, THM and HAA samples)
- no sample location available at the time of sampling (very small systems)

Chemical and Physical Parameters: Results

Results for chemical and physical parameters are sent to the Department of Environment and Conservation when laboratory analysis is complete. The Department then evaluates the results by comparing them to current *Guidelines for Canadian Drinking Water Quality* (GCDWQ). Water quality results are compared to the GCDWQ to identify exceedances in chemical and physical parameters that may pose a risk to human health or aesthetic approval of drinking water.

Table 11 summarizes the tap water

Table 11: Exceedances per Fiscal Year

Department	Exceedances						
	Parameters		2010–11	2011–12	2012–13	2013–14	2014–15
Service NL	Bacteriological	*Escherichia coli*	167	196	133	132	211
		Total coliforms	633	844	930	962	932
Environment and Conservation	Chemical and Physical	Turbidity	106	98	103	78	170
		Arsenic	5	4	4	13	6
		Barium	1	2	1	2	1
		Fluoride	2	0	1	0	0
		Lead	2	8	4	2	4
	Disinfection By-Products	Trihalomethanes (THMs)	126	129	132	117	93
		Haloacetic Acids (HAAs)	157	165	147	153	117
	Aesthetic	Colour	488	514	433	466	307
		pH	235	361	335	368	196
		Total Dissolved Solids	17	11	17	19	11
		Chloride	5	3	6	5	2
		Sodium	2	3	4	3	2
		Sulphate	4	3	2	2	1
		Copper	6	11	1	5	9
		Iron	91	107	113	127	86
		Manganese	70	83	106	102	81

bacteriological, chemical and physical parameter exceedances for the 2010–11, 2011–12, 2012–13, 2013–14 and 2014–15 fiscal years. When an exceedance is confirmed for a parameter that may pose risk to human health, an exceedance report is sent immediately to the community, Departments of Health and Community Services, Municipal Affairs and Service NL. Exceedances for aesthetic parameters are also reported to communities, along with all other parameter results, in quarterly drinking water quality reports. Communities and the public can access this drinking water quality data through the WRMD's Water Resources Portal online at: *http://maps.gov.nl.ca/water/*.

The WRMD's sampling and reporting procedures are outlined in the *Drinking Water Quality Monitoring Manual*, which can be viewed

online at: *http://www.env.gov.nl.ca/env/waterres/quality/drinkingwater/manual.html*.

Data Management and Reporting

The large volume of data acquired during the implementation of the various components of the MBSAP must undergo a stringent quality assurance/quality control (QA/QC) process before it can be compiled, analyzed, and reported to the public. The WRMD strives to collect quality data and report it to the public in an open and timely manner.

Table 12: Types of Public Reports Produced by ENVC

Type	Description
Seasonal Community Drinking Water Quality Reports	All communities with public drinking water systems are provided with an interpreted report if seasonal monitoring has been conducted. These reports clearly indicate any parameters that exceed the *Guidelines for Canadian Drinking Water Quality*. The province recommends that communities post these reports in public locations. In the 2014–15 fiscal year, 1,152 seasonal community reports were mailed out.
Exceedance Reports	Exceedance reports are provided to communities when a laboratory result is above the *Guidelines for Canadian Drinking Water Quality* for contaminant parameters. These reports are faxed or mailed to the affected community as soon as the department receives the results. In the 2014–15 fiscal year, 10 exceedance reports were sent out to communities.
Annual Drinking Water Safety in Newfoundland and Labrador Report	The Annual Drinking Water Safety in Newfoundland and Labrador Report has been published each year since 2001. It outlines accomplishments and activities under the Multi-Barrier Strategic Action Plan for drinking water safety in a particular fiscal year.
Web Documents on Drinking Water Quality	The WRMD's website is an important tool used to communicate with the public. It is updated regularly with new information on drinking water quality and related topics. The "News and Highlights" screen, lists the most current information and is online at: *http://www.env.gov.nl.ca/env/waterres/whatsnew/index.html*

Table 12 summarizes the reports used to communicate the results from programs related to drinking water quality.

Inspection and Enforcement

The *Water Resources Act* states that a permit holder shall allow inspectors to carry out inspections of an activity for which a license or permit has been issued. Investigations can also occur once the Department of Environment and Conservation is made aware of a contravention of the *Water Resources Act* or associated regulations and permits. Departmental staff conduct inspections of water supply systems under construction, the operation of water treatment and distribution systems, groundwater wells being drilled, and activities taking place in PPWSAs to ensure that they comply with the terms and conditions of the permit. Communities should conduct routine surveillance and monitoring for approved development activities within PPWSAs to ensure existing activities are being conducted in an environmentally acceptable manner and that there are no development activities taking place without prior approval from the department. Investigations are typically issue-specific.

In the 2014–15 fiscal year, departmental staff carried out a total of 35 inspections/ investigations. In addition, staff visited public water supplies two to four times a year during scheduled monitoring work. Table 13 presents a breakdown of inspections for 2014–15.

Table 13: Inspections by ENVC for 2014–15

Inspection Type	Count
Water and Sewer Construction	29
Protected Surface Water Supplies	4
Protected Groundwater Supplies	1
Water System Operation	1
Total	35

One of ENVC's main goals is to ensure communities achieve clean and safe drinking water in a sustainable and efficient manner. When non-compliance with the conditions of a permit is reported, WRMD responds to enforce the permit.

Operator Education, Training, and Certification

Certified operators are integral to the proper operation and maintenance of the systems that supply clean and safe drinking water to the consumer. Through continuing education, training, and certification, the Department of Environment and Conservation addresses the need for qualified drinking water treatment and distribution system operators in this province.

During the 2014–15 fiscal year, twelve drinking water related classroom seminars were held at five locations across the province.

Operator Training

The operator training program provides municipal drinking water system operators with hands-on training opportunities. The program utilizes three mobile training units (MTUs) that have been equipped with various equipment and tools used in the operation and maintenance of drinking water systems. Training sessions are delivered on-site in the operator's community to maximize accessibility to the training opportunities. During 2014–15, the province's three operator trainers conducted 110 on-site training sessions throughout the province. These sessions were attended by a total of 148 participants.

Northern Arm Takes Proactive Approach to Servicing Fire Hydrants

Northern Arm is a small town of approximately 400 people that is located along the shoreline of the Bay of Exploits on the island portion of Newfoundland and Labrador. In cooperation with the Operator Education, Training and Certification (OETC) program the town is optimizing the operation and maintenance of their fire hydrants and training of their personnel.

During 2014-15, the OETC's operator-trainer for the central region conducted training sessions with both the town's municipal operators and volunteer fire department. The municipal water system operators had three fire hydrants that needed servicing and repairs because they were out of order. They requested that the OETC program provide the training to enable them to order parts and undertake repairs to the hydrants. A member of the volunteer fire department also received the same training as part of his job to look after non-municipal fire hydrants. The training sessions delivered to the town of Northern Arm were well received, to the benefit of the community's firefighting program, fire hydrant users, and their residents.

The town's operators were vigilant in applying their training and within a few weeks had all of their hydrants repaired and back in service. Their actions were the start of implementing a fire hydrant maintenance program to achieve the following outcomes:

- ensuring the operation of their hydrants through a maintenance routine which includes record keeping, regular inspections and testing of operation
- prolonging the life of the infrastructure by implementing the information received from the inspections and making the necessary repairs
- reducing the cost of maintenance, repair and replacement by acting on issues before they result in irreparable damage.

The town's volunteer fire fighters learned that there are more uses for the hydrants than firefighting and that improper use of the hydrants could create consequences in the town's water distribution system. Some of those extra uses include water main flushing, tanker truck filling, and as pressure monitoring and leak detection access points. The consequences of improper usage of the hydrants include creating water hammer and pressure surging, damage to internal parts, and creating vacuum conditions in the watermain which could lead to contamination.

The town of Northern Arm discovered that it is imperative that municipalities have their town operations crew and their fire department working together in unison. This ensures that the town's fire hydrants are properly operated and maintained and the town of Northern Arm is doing it right.

Fire Hydrant Repair

Firefighter Training

Operator Certification

Certification is an essential component for the operation of a safe drinking water system.

There are 414 certified water or wastewater operators in Newfoundland and Labrador. Forty-two operators achieved their first level of certification in 2014–15. Table 14 contains the total number of operator certificates issued by classification.

Table 14: Total Number of Operator Certificates Issued for 2014–15

Water Distribution	39
Water Treatment	13
Wastewater Collection	45
Wastewater Treatment	8
Total Certificates	105

Table 15 summarizes the number of communities in Newfoundland and Labrador that employ at least one certified operator divided by classification.

Table 15: Number of Communities Employing Certified Operators

Certification Classification	Number of Communities
Water Distribution	115
Water Treatment	21
Wastewater Collection	49
Wastewater Treatment	19

**The above numbers do not include industrial facilities that employ certified operators - only municipalities.*

Annual Clean and Safe Drinking Water Workshop

The Annual Clean and Safe Drinking Water Workshop is open to all community operators and administrators. It brings together drinking water quality stakeholders and provides them with opportunities to learn about drinking water safety, to exchange information, and to share experiences. The presentations delivered throughout this event are carefully chosen to address specific challenges faced by small communities in providing clean and safe drinking water.

The 2015 Clean and Safe Drinking Water Workshop took place on March 24 - 26, 2015 in Gander. The workshop attracted 269 participants from across the province and country. A travel subsidy is provided by the Department of Municipal Affairs to attend the workshop. Communities from the island portion of the province that were approved for the subsidy were reimbursed up to $400, and communities from Labrador that were approved for the subsidy were reimbursed up to $700. The next Annual Clean and Safe Drinking Water Workshop is scheduled for March 22 - 24, 2016.

Corrective Measures

The Level II components of the MBSAP just discussed, provide an ongoing picture of drinking water supply, quality, and infrastructure. The issues identified require the implementation of corrective actions to deal with these challenges. Corrective measures can include structural, non-structural, operational techniques and other best management practices.

There are five classes of corrective measures: policy, design, water system management, water treatment alternatives, and source alternatives. Table 16 shows the progress made in each category of corrective measures.

Table 16: Corrective Measures Undertaken for 2014–15

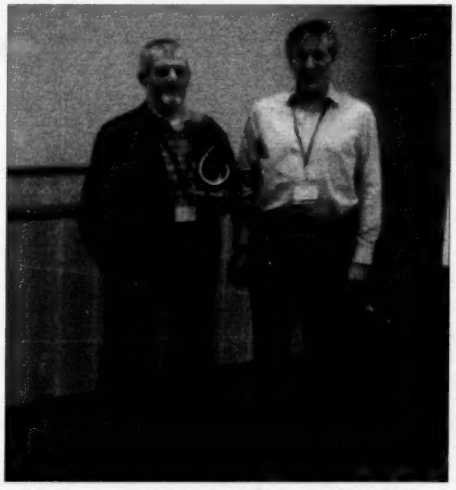
Corrective Measure	Description
Policy	• Year 14 of the Multi-Barrier Strategic Action Plan for Safe Drinking Water in NL • Update of the Bacteriological Standards to the Drinking Water Treatment Standard for NL drafted • The Interdepartmental Safe Drinking Water Technical Working Group met five times
Design	• Updating the *Newfoundland and Labrador Guidelines for the Design, Construction and Operation of Water and Sewerage Systems* to the *Newfoundland and Labrador Guidelines for the Design of Drinking Water Systems* underway
Water System Management	• Ongoing operator education, training and certification • Permits to Construct issued relating to water system management: o Water main upgrades and replacement– 25 o New or upgraded pumps or pumphouse– 6 o New contact tanks or pipe– 2 o New or upgraded valves– 7 o New or upgraded flow meter– 3 • One community assessment undertaken in response to drinking water quality issues • One Permit to Operate Drinking Water Inspection Report and Inspection Risk Rating issued
Water Treatment Alternatives	• Permits to Construct issued relating to water treatment: o New chlorination systems– 7 o Chlorination system upgrades– 2 o New Arsenic removal system– 1 o New On-site Generation MIOX System–1 o New PWDUs– 5 o Water treatment plant upgrades– 2 • Study on NL water treatment plants being finalized • Study on NL filtration systems completed
Source Alternatives	• Permits to Construct issued relating to water sources: o New wells– 1 o New or upgraded intake or screenhouse– 4 • One public wellhead inspection undertaken

2015 Operator of the Year Awards

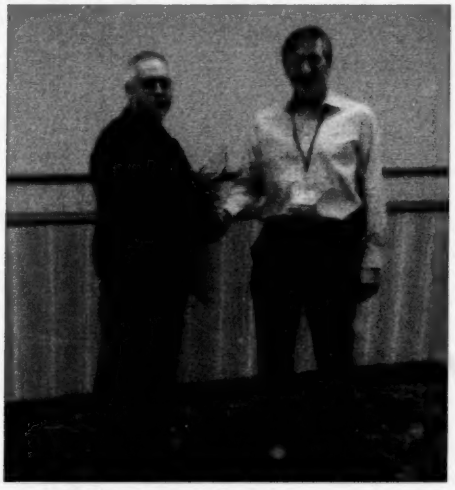
The Department of Environment and Conservation created the Operator of the Year Awards to recognize the outstanding dedication of municipal operators in providing clean and safe drinking water. Community representatives across the province were invited to nominate an operator they felt had made an outstanding contribution. In total, 26 nominations were submitted to the selection committee for consideration in two categories: Volunteer Operator of the Year and Operator of the Year.

The Volunteer Operator of the Year Award was created to honour an individual that operates a municipal drinking water system without any monetary compensation. The 2015 Award was presented to Mr. Victor Keats from the Local Service District (LSD) of Phillips Head. Mr. Keats has been a volunteer water system operator with the community for 8 years. He is committed to ensuring that the chlorination system equipment, pumps, valves, and gauges are all working properly, even during the winter months when he often travels by foot to the pumphouse. Mr. Keats is a very much appreciated member of the LSD of Phillips Head.

The 2015 Operator of the Year Award was presented to Mr. Marvin Bull, Town of Eastport. Mr. Bull has been responsible for operating and maintaining the town's drinking water systems since 1998. During that time, he has been actively involved in training opportunities and has successfully achieved his Class II Water Distribution Certification. Marvin has been very proactive in the operation and maintenance of the drinking water system in Eastport. He is always willing to go that extra mile to help the residents of his community, and in return they speak very highly of him. The Town of Eastport were pleased to nominate Marvin Bull for the 2015 Operator of the Year Award.



Mr. Victor Keats, (left) recipient of the 2015 Volunteer Operator of the Year Award



Mr. Marvin Bull, (left) recipient of the 2015 Operator of the Year Award

Level III

The management of drinking water depends on the contribution of several levels of government as well as the public.

The four components in Level III of the MBSAP are:

1. legislative and policy frameworks
2. public involvement and awareness
3. guidelines, standards and objectives
4. research and development

Legislative and Policy Frameworks

The legislation that governs public drinking water systems in the province includes the *Water Resources Act*, the *Municipal Affairs Act*, and the *Municipalities Act*. All of the legislation, policy directives, standards, and regulations are posted on the province's website. These three Acts contain broadly stated initiatives:

- the *Water Resources Act* regulates the administration of water rights, the protection of public water supply areas, and a range of construction and development permits pertaining to drinking water infrastructure and development that may impact public water supplies
- the *Municipal Affairs Act* administers the management of waterworks
- the *Municipalities Act* grants powers to municipalities for the construction, operation, and maintenance of water systems and for the allocation of funds for this work

Government also introduces regulations, guidelines and policy directives to provide more explicit direction for legislation.

Interdepartmental Cooperation

The Provincial Government's efforts to provide clean and safe drinking water are the result of the combined contributions of four departments: the Department of Environment and Conservation (acting as the lead agency), Health and Community Services, Municipal Affairs, and Service NL. Each department is responsible for various aspects of the MBSAP. Their efforts are coordinated by an interdepartmental committee of deputy ministers, which is chaired by the Deputy Minister of the Department of Environment and Conservation. This committee met once in 2014–15. The committee's work is supported by the Interdepartmental Safe Drinking Water Technical Working Group, which was formed in June 2000. The working group is chaired by the Director of the Water Resources Management Division, Department of Environment and Conservation, and includes representatives from the Departments of Health and Community Services, Municipal Affairs, and Service NL. Medical Officers of Health and representatives from the Public Health Laboratory are also members of the working group. The working group met five times in 2014–15, with all activities reported to senior government officials. The working group leads work on the development of policy and guidelines relating to drinking water safety.

In 2014–15, the working group focused on the QA/QC of BWAs, and the development of water treatment standards which are under consideration for approval.

Public Involvement and Awareness

The Department of Environment and Conservation continues to provide accessible and timely drinking water quality information to the public. The department's website is a major tool for increasing public awareness and encouraging public involvement. Watershed management committees are another way the public can participate in efforts to ensure clean and safe drinking water supplies. They are excellent forums in which stakeholders can voice opinions and concerns about land management and water quality issues in their watershed areas. The establishment of watershed management committees furthers the Department of Environment and Conservation's goal of increasing public involvement and awareness of drinking water safety issues.

Videos for the following drinking water related topics can be found on the NL Water Resources channel at *https://www.youtube.com/user/NLWaterResources*:

- A video addressing common questions relating to Permits to Construct water and sewer infrastructure in Newfoundland and Labrador
- A video explaining how to find information on public drinking water systems in Newfoundland and Labrador
- A video addressing common questions relating to Permits to Operate for water and sewer infrastructure in Newfoundland and Labrador

Guidelines, Standards and Objectives

To ensure clean and safe drinking water, the Department of Environment and Conservation sets drinking water safety guidelines, standards, and objectives, and regularly reviews and updates them to address current issues and challenges. Guidelines, standards and objectives currently available on the website, *http://www.env.gov.nl.ca/env/waterres/regulations/index.html*, include:

- *Bacteriological Quality of Drinking Water*
- *Standards for Chemical and Physical Monitoring*
- *Guidelines for the Design, Construction and Operation of Water and Sewerage Systems*
- *Chlorination Equipment Selection Guidelines*
- *Best Management Practices for the Control of Disinfection by-Products in Drinking Water Systems in Newfoundland and Labrador*
- *Guidelines for Disinfecting Dug and Drilled Wells*
- *Guidelines for Sealing Groundwater Wells*
- *Selection Criteria and Guidelines for the Design, Construction and Operation of Potable Water Dispensing Units*

Research and Development

In order to stay on top of current and emerging issues that affect drinking water safety, the Department of Environment and Conservation undertakes several research and development activities each year. During 2014–15 the Department of Environment and Conservation evaluated filtration systems used in the province and examined the effectiveness of water treatment plants in the province.

The Path Forward

Department of Environment and Conservation

The Department of Environment and Conservation will continue to pursue its commitment to develop and strengthen all levels and components of the Multi-Barrier Strategic Action Plan.

The department's drinking water monitoring activities for the 2015–16 fiscal year are planned as follows:

- 3,853 drinking water quality samples scheduled for collection and analysis
- 90 source water samples, to be analyzed for inorganic chemical parameters
- 1,097 tap water samples, to be analyzed for inorganic chemical parameters
- 1,333 tap water samples, to be analyzed for trihalomethanes
- 1,333 tap water samples, to be analyzed for haloacetic acids

Special sampling for caffeine, bromate and radionuclides will also be undertaken in the 2015–16 fiscal year.

The Department will continue to provide education and hands-on training opportunities to water system operators. The 2016 Clean and Safe Drinking Water Workshop is scheduled for March 22-24, 2016 in Gander. The Department looks forward to sharing information and experiences with the various stakeholders involved in providing clean and safe drinking water to the people of the province.

The Department will be implementing a BWA Reduction Initiative in the 2015–16 fiscal year that will entail the development of an assessment tool to identify causes of BWAs, standard operating procedures (SOP) for the removal of BWAs for each reason code, application of the SOPs, and the development of public awareness material on BWAs.

The Department will also investigate options for integrating a risk based management approach to drinking water safety into the established MBSAP framework. This follows recent recommendations from the World Health Organization (WHO) for the establishment of Water Safety Plans.

Department of Health and Community Services

Through the Newfoundland and Labrador Public Health Laboratory and regional drinking water testing locations, water samples from municipal and private supplies are tested for the bacteriological indicators *E. coli* and total coliform bacteria.

In 2015–16 the Department of Health and Community Services and the four Regional Health Authorities will continue with their drinking water safety initiatives by working collaboratively with provincial and municipal partners to maintain, and enhance where possible, drinking water related health protection efforts and disease prevention initiatives.

Key areas of focus are to:

- Provide policy and technical support to Environmental Technicians and Environmental Health Officers with Service NL who perform bacteriological water quality monitoring, interpret bacteriological water quality test results and issue boil water advisories.
- Review boil water advisory guidelines, and reason codes and revise where necessary.
- Review drinking water safety promotional

materials, and revise where necessary. Drinking water awareness information is available online at: *http://www.health.gov.nl.ca/health/publichealth/envhealth/drinkingwater.html.*

- Provide health-related advice to municipal leaders and residents when unsatisfactory water quality in public water supplies is identified.
- Continue to provide regional bacteriological water quality testing services as part of Government's bacteriological water quality monitoring program.

Department of Municipal Affairs

The Department of Municipal Affairs will continue to financially support requests from communities for the provision of water related infrastructure as well as provide implementation oversight. Cost effective approaches with regard to regionalization of operational and maintenance services also will be encouraged in the way of both advisory and financial support. The Department will be implementing a regional water and wastewater operator pilot project to help develop the knowledge and skills within the community to maintain and operate a community water system.

The Department continues to support the Provincial Government's Rural Drinking Water Safety Initiative by providing residents of small communities with access to high quality drinking water through the construction of potable water dispensing units. As a result, eight systems were completed in 2014–15 with an additional seven being advanced for 2015–16. These water kiosks are small-scale water treatment systems which pump and treat water from the municipal supply, store the treated water and allow residents to manually collect the water from a small shelter.

The Department will continue to support the Community Sustainablility Partnership Initiative through the establishment of the Regional Operators Pilot Program. This pilot will see the hiring of three regional operators through the Central, Eastern and Western Regional Service Boards to help provide additional capacity to towns in the operation of their drinking water systems.

Service NL

Through its bacteriological water monitoring program, Service NL helps ensure that public drinking water is protected from waterborne diseases and is safe for consumption. Its ongoing high level of public water sample collection is an indication of the Department's commitment to a satisfactory level of bacteriological water monitoring and compliance with levels recommended in the province's standards and the *Guidelines for Canadian Drinking Water Quality*.

The Department's six Environmental Technicians are front-line staff with a primary role in the collection and submission of municipal water samples. Environmental Health Officers undertake the essential interpretation of the test results and notification of any issues regarding adverse reports to communities. These efforts are key in helping to secure the safety of the province's public drinking water supplies.

Service NL will also continue to partner with the Department of Health and Community Services and the Regional Health Authorities on water quality issues. It is important to ensure that Environmental Technicians and Environmental Health Officers have access to on-going professional development, including bacteriological water monitoring. Support for professional development in this area will continue.

Service NL and the Department of Municipal Affairs will work with OCIO to update and improve the Municipal Infrastructure Management System (MIMS) used to store bacteriological water quality data and track Boil Water Advisories for the province.

Weblinks:

Department of Environment and Conservation
http://www.env.gov.nl.ca/env/index.html

Newfoundland and Labrador *Water Resources Act* SNL 2002 cW-4.01
http://www.assembly.nl.ca/Legislation/sr/statutes/w04-01.htm

Water Resources Management Division Reports and Publications
http://www.env.gov.nl.ca/env/waterres/reports/index.html

Newfoundland and Labrador Water Resources Portal
http://www.env.gov.nl.ca/env/waterres/portal.html

Protected Water Supply Area List and GIS Layers
http://www.env.gov.nl.ca/env/waterres/gis/index.html

Guidelines for Canadian Drinking Water Quality: Summary Table
http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/sum_guide-res_recom/index-eng.php

Standards for Bacteriological Quality of Drinking Water
http://www.env.gov.nl.ca/env/waterres/regulations/policies/standards_microbiological.html

Standards for Chemical and Physical Monitoring of Drinking Water
http://www.env.gov.nl.ca/env/waterres/regulations/policies/physical_monitoring.html

Policy for Drinking Water Quality Monitoring and Reporting for Public Water Supplies
http://www.env.gov.nl.ca/env/waterres/regulations/policies/water_quality.html

Department of Environment and Conservation Drinking Water Quality Data
http://www.env.gov.nl.ca/env/waterres/quality/drinkingwater/chemical.html

Acts, Regulations, Policy Directives, and Water Quality Standards
http://www.env.gov.nl.ca/env/waterres/regulations/policies/index.html

Education, Training, and Certification
http://www.env.gov.nl.ca/env/waterres/training/index.html

Guidelines for the Design, Construction, and Operation of Water and Sewerage Systems
http://www.env.gov.nl.ca/env/waterres/waste/groundwater/report.html

Best Management Practices for the Control of Disinfection By-products in Drinking Water Systems in Newfoundland and Labrador
http://www.env.gov.nl.ca/env/waterres/reports/cwws/index.html

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